

Varick (Theo. R.)

Compliments of the Author

CASES
OF
SUBPERIOSTEAL RESECTION.

BY
THEODORE R. VARICK, M. D.,

SURGEON TO ST. FRANCIS'S AND JERSEY CITY CHARITY HOSPITALS,
JERSEY CITY, N. J.

[REPRINTED FROM THE NEW YORK MEDICAL JOURNAL, JAN., 1878.]



NEW YORK:
D. APPLETON AND COMPANY,
549 & 551 BROADWAY,
1878.

ELEMENTS OF GEOLOGY.

A TEXT-BOOK

FOR COLLEGES AND FOR THE GENERAL READER.

By JOSEPH LE CONTE,

Author of "Religion and Science," etc., and Professor of Geology and Natural
History in the University of California.

1 vol., 8vo. 588 pages. Cloth. Price, - - - - - \$4.50.

"I have desired to make a work which shall be both interesting and profitable to the intelligent general reader, and at the same time a suitable text-book for the higher classes of our colleges. In the selection of material and mode of presentation I have been guided by long experience as to what it is possible to make interesting to a class of young men somewhat advanced in general culture and eager for knowledge, but not expecting to become special geologists."—*Extract from Preface.*

D. APPLETON & CO., Publishers, 549 & 551 Broadway, N. Y.

C A S E S
OF
SUBPERIOSTEAL RESECTION.

BY
THEODORE R. VARICK, M. D.,
SURGEON TO ST. FRANCIS'S AND JERSEY CITY CHARITY HOSPITALS,
JERSEY CITY, N. J.

[REPRINTED FROM THE NEW YORK MEDICAL JOURNAL, JAN., 1878.]

NEW YORK:
D. APPLETON AND COMPANY,
549 & 551 BROADWAY.
1878.

CASES OF SUBPERIOSTEAL RESECTION.

THE power possessed by the periosteum of regenerating bone which may have been removed by operation, or have undergone death, has long been recognized by the profession. It was reserved for Ollier, in his great work,¹ to bring it prominently forward and demonstrate its applicability to ~~consecu-~~ *consecutive* surgery.

It would be manifestly inappropriate, in this connection, to allude to the numerous operations performed for the extirpation of bone, and I shall therefore limit this paper to those cases resulting in reproduction of osseous tissue.

The term "subperiosteal resection" is used in a restricted sense, and is applied to "those cases in which the bone, previous to the operation, retains its natural connections (at least to a great extent), and in which the periosteal sheath has not yet been formed." In such cases, after the removal of the whole thickness of the diseased or injured bone for a certain

¹ "Traité expérimentale et clinique de la Régénération des Os," Paris, 1867.

portion of its length, the parts left behind are held together only by the periosteum and the adjacent soft parts.¹

Although the operation on the clavicle does not reach the magnitude of some of those on the larger bones, its successful result is none the less important to the individual when we consider its proximity to the great vessels of the neck, its muscular attachments, and its future influence on the usefulness of the arm.

Case of Subperiosteal Resection of the Clavicle, with Reproduction of Bone.—In the *New York Medical Record*² will be found the report of a case of this kind operated on by me, in which there was reproduced a thoroughly ossified clavicle.

I now report a second case, as follows: Timothy Mitchell, aged thirty-one years, a native of Ireland, by occupation a laborer, was admitted to the Jersey City Charity Hospital April 7, 1874, suffering from a large flabby ulcer over the acromial end of the right clavicle.

Previous History.—About ten years ago he contracted chancres in London, which were not followed by any constitutional effect. About four years ago he again contracted chancres in New York, which were followed by syphilitic eruptions. Two years previous to his admission he suffered from periostitis, especially marked over the right clavicle. In the latter situation it gradually increased in severity, compelling the patient to give up work. An abscess had formed over the acromial end, giving vent to a copious discharge of pus. On admission he was pale, weak, and emaciated, with hectic sweats, etc. In addition to the ulcer previously indicated, there were numerous small openings leading down to the bone, which, on exploration with the probe, was found roughened, and evidently extensively diseased. An operation having been decided on, an incision was made through the soft parts to the bone, extending from the margin of the ulcer to the sterno-clavicular articulation. At this point the perios-

¹ "Biennial Retrospect of Medicine and Surgery," 1867, p. 257.

² Vol. iv., p. 510, 1869.

teum was separated and a curved spatula passed posteriorly, and the bone sawed through with Hayes's saw. The periosteum, which was loosely adherent, was peeled off, thereby liberating the bone from its attachments, and it was removed. At the point corresponding with the ulcer the periosteum was destroyed, except a narrow strip about an eighth of an

FIG. 1.



From a Photograph taken on the Day of his Discharge from the Hospital.

inch wide, which formed the only connecting medium with the acromion. The arm was retained in position by means of adhesive straps, after Sayre's method for fracture of the clavicle. The patient was discharged cured, August 11, 1874,

with a firmly-ossified clavicle, free from dropping of the shoulder or any deformity, and with perfect use of the arm (*see* Fig. 1).

Of recorded cases I have been able to collect the following:

CASE I.—M., aged twenty-six years, was admitted into the Hôtel Dieu, Paris, September 7, 1765, with caries of left clavicle. M. Moreau found it denuded of periosteum. The bone was easily isolated (being only retained by the skin) and removed. He died some time after from a tumor of the thigh. On *post mortem*, the whole clavicle was found regenerated.¹

CASE II.—M., aged forty years, entered Lariboisière June 27, 1854, for spontaneous fracture of the right clavicle, followed by osteitis and abscess. Resection was performed, with preservation of periosteum and regeneration of the bone.

CASE III.—Meyer,² of Zurich, removed a clavicle for caries in a man aged thirty-one years. In seven weeks the wound healed, and the patient recovered the use of the arm.

The patient died five years after, and there was found a partial regeneration of bone, the deficiency being supplied by cartilage.

CASE IV.—Blondin,³ in 1842, resected a portion of the clavicle for caries. He preserved only the periosteum which covered the inferior aspect of the bone. This periosteum reproduced bone, but not a complete clavicle.

CASE V.—Biangini,⁴ of Pistoja, reports a case of successful extirpation for necrosis. Miguel alleges the bone was regenerated.

CASE VI.—John W. Irvine, L. R. C. S., Edinburgh,⁵ reports a case of excision and regeneration of the entire clavicle.

CASE VII.—Champion⁶ relates that the elder Pelletan ex-

¹ Chassaignac, "Traité clinique et pratique des opérations chirurgicales," tom. i., p. 669.

² *Journal de Graefe et Walther*, Bd. xix., p. 71.

³ *Bull. de la Soc. du Chir.*, Paris, vol. iv., 2d series, p. 137, 1864.

⁴ *Gaz. Méd. de Paris*, 1840, p. 460.

⁵ *London Lancet*, vol. i., p. 206, 1867.

⁶ "Convers à l'Hôtel Dieu," 1802.

tracted the entire clavicle in the case of a child with abscess of the shoulder, following small-pox, and the bone was reproduced.

CASE VIII.—Dr. Porquet, of Vire,¹ removed the right clavicle for caries of both extremities of the bone. In this case there was reproduction of bone.

In the “Medical and Surgical History of the War of the Rebellion,” part ii., p. 476, Dr. George A. Otis gives the record of thirty cases of extirpation of the clavicle for various causes, in which a number are reported as having successful results, leaving a doubt as to whether the results refer to the recovery of the patients, or regeneration of the part removed; obliging the reader to consult the authorities there quoted for further information.²

M. Duplay³ reports the following:

A young man, sixteen years old, entered St. Antoine March 26, 1872. During the siege of Paris he had variola, followed by an abscess in the right axilla. Abscesses had long since healed. In the beginning of 1873 his right shoulder and axilla became the seat of swelling and pain. An abscess opened in the axilla. The external portion of the clavicle appeared thickened and the tissues infiltrated. An opening was made below, through which there was an abundant discharge of fetid pus.

April 4th.—There was found osteitis, and necrosis of the outer portion of the clavicle.

August 19th.—Patient etherized, and the periosteum easily raised from the bone, which was divided by a chain-saw at the junction of the middle with the outer third. The outer portion of the bone was then pulled out.

Five days after the operation one could certainly feel a hard band giving the sensation of bone. Soon this new bone became as large as the old. In October the wound became fungous and the suppuration more abundant and sanious, and

¹ *L'Année Médicale*, May, 1877.

² On inspection of the record above quoted, it will be perceived that but three cases, numbered respectively 10, 24, and 28, reported by Bianchini, Irvine, and myself, are noted as having resulted in reproduction of bone.

³ *Gaz. Hebdomadaire de Med. et de Chir.*, Paris, March 6, 1874, p. 155.

the new bone became imbedded in the swollen tissues; at the same time the inner fragment became inflamed, and denuded bone was detected with the probe. Notwithstanding injections of iodine, an abscess formed at the internal extremity of the clavicle. At the end of November the condition of the patient was worse than before any treatment, and he refused to submit to any further operation.

This fact shows that the preservation of the periosteum in certain cases does more harm than good. The new bone was of a bad quality, because the periosteum itself was diseased. The health of the patient was perfect at the time of the operation.

This case of M. Duplay is certainly an unfortunate one, and carries its own commentary with it; for it is fair to assume that, had the entire bone been removed, a different result might have been attained, and that the unpleasant train of symptoms was due rather to the presence of diseased bone than to unhealthy periosteum.

Case of Subperiosteal Resection of the Diaphysis of the Tibia; Regeneration of Bone, and Complete Recovery.—John M., aged nineteen years, a native of the United States, was admitted to St. Francis's Hospital, Jersey City, December 17, 1874, on account of a large indolent ulcer over the centre of the diaphysis of the tibia, covered with flabby granulations, and having for its base denuded and roughened bone. The bone was found to be hypertrophied, particularly at the site of the ulcer, gradually diminishing in diameter both above and below this point. He also suffered severely from osteo-copic pains, to such an extent as to require the free administration of anodynes in order to procure sleep. Frequent rigors, followed by fever and sweats, with loss of appetite and emaciation, marked his general hectic condition. His trouble he attributed to "barking his shin" against a cart-wheel, some two years previous to his admission. On consultation with the hospital-staff, it was determined to perform subperiosteal resection, in preference to amputation. I accordingly made an incision over the spine of the tibia, commencing just below the tuberosity, through the centre of the ulcer, to within two inches of the tibio-astragaloid articulation. This incision was

carried through the soft parts, including the periosteum, which was found easily separable from the bone.

The separation involved the entire circumference of the bone, both above and below, to points at which the periosteum was found firmly adherent, indicating that healthy tissue had been reached. I then passed curved spatulæ posteriorly at either end of the exposed bone, and made the sections with a metacarpal saw from before backward, sawing down upon the spatulæ, which not only served as retractors, but also protected the soft parts from injury. The entire periosteum, except at the site of the ulcer, was preserved, lying like a trough at the bottom of the wound, and showing completely the form of the posterior and lateral aspects of the bone. The leg was placed in a fracture-box, and the wound filled with balsam of Peru and loosely packed with oakum. Granulations rapidly sprang up from the entire surface of the periosteum, as well as from the cut ends of the bone. Those from the bone assuming a conical form, appearing to spring from the medullary cavity and endosteum, were quite as exuberant from the lower as from the upper portion, reaching out and gradually approximating each other, while coalescing with those from the bottom and lateral portions, soon obliterating the cavity left by the extirpated bone. As the part filled up, the integument was gradually brought together, and finally healed with a very narrow cicatrix, except at the former location of the ulcer, which part did not thoroughly heal until ossification had taken place.

The portion removed measured $5\frac{3}{4}$ inches anteriorly and 5 inches posteriorly in length, and $5\frac{1}{8}$ inches in circumference, as against about 3 inches, the average circumference of healthy bone.

The part removed, on longitudinal section, was found to be eburnated to nearly its entire thickness, which, taken in connection with its hypertrophied condition, would indicate the existence of chronic osteitis.

The structural changes are shown in the accompanying cut, which represents the actual size of the part removed (see Fig. 2).

Solidification progressed rapidly, and at the end of six months

the patient was not only able to walk without the aid of stick or crutch, but could support the entire weight on the limb.

FIG. 2.



Actual Size of Bone Removed.

He was discharged August 20, 1875, eight months and three days from the time of his admission, with less than one-

quarter of an inch shortening, and a perfectly-restored limb (see Fig. 3).

FIG. 3.



From Photograph taken after Recovery.

Dr. David W. Cheever, in the "Boston City Hospital Reports, 1870," records the excision of the entire diaphysis and lower epiphysis of the tibia from a girl of thirteen years, for suppurative periostitis, followed by reproduction of bone and a useful limb. In the service of Dr. Buckingham, of the same hospital, there is reported the case of a girl, eight years old, suffering from suppurative periostitis, with denudation of the diaphysis of the tibia. About five inches of the shaft were removed, "with a good recovery and useful limb.

A third case, operated on by Dr. F. C. Ropes, is reported as still being in the hospital¹, four months after the removal of the diaphysis of the tibia.

The report continues: "The wound has closed, and the new bone is getting firm. The leg is shortened, and there is dislocation of the fibula, as in the other cases.

Dr. Cheever, in the same report, writes: "That removals of the diaphysis, and especially both diaphysis and epiphysis, of the tibia are rare, is proved by the small number of cases (*five* in all) collected by Ollier, of Lyons, in his great work on the 'Regeneration of Bone.'"

I here give an epitome of the cases alluded to by Dr. Cheever:

1. "Subperiosteal resection of four inches of the lower end of the tibia for suppurative osteitis, with separation of the epiphysis and invasion of the ankle-joint—by Jambon and Aubert, of Mècon. Excellent reproduction of bone, and perfect restoration of the limb.

2. "Suppurative periostitis of the whole diaphysis of the tibia, with grave constitutional symptoms. Extraction of the diaphysis before the reossification of the periosteal sheath. Recovery, renewal of bone, and shortening—by T. Holmes, of London.

3. "Suppurative periostitis of the diaphysis of the tibia, with severe constitutional symptoms. Removal of the whole diaphysis—by Lentenneur. Recovery.

4. "Subperiosteal resection of the diaphysis of the tibia, for chronic osteitis, to an extent of eight inches—by Larghi. Regeneration of the entire fragment removed.

5. "Ulcerative osteitis of the tibia; subperiosteal resection of the entire diaphysis—by Greus y Manso, of Grenada. Complete regeneration of the part removed. Slow recovery, with restoration of the functions of the limb."

Dr. Nendörfer, an Austrian surgeon, who served in the Schleswig-Holstein war, reports¹ twelve cases of resection from the shafts of long bones which recovered, "and that in none

¹ Langenbeck's "Archives," p. 496.

of these did reproduction fail to ensue, nor in any of them was a false joint left. He says, however, in none of his cases, in spite of the most careful preservation of the periosteum, did the regenerated bone reach either the length or circumference of the original, but seemed, as it were, to resemble the younger stage of it; and so there was, in some (all?) cases, more or less shortening of the limb."¹

"*Excision of Two and One-half Inches of the Tibia*, by Dr. Kempster,² for gun-shot injury. Although it is not absolutely stated that the periosteum was spared, yet it seems to be implied.

"Two months after the operation (December 30th) the gap was filled up by a hard mass, which no longer allowed of any motion of the fragments, and the patient was allowed to leave his bed."³

At a stated meeting of the New York Pathological Society, held January 11, 1865, Dr. Conant presented a portion of the tibia removed from a boy seven years of age, shortly after the receipt of a compound fracture of the leg, the result of a railroad-injury on the 21st of July last. Dr. Conant saw the patient about three hours after the accident occurred, and found the limb very much crushed.

The portion of bone which was removed, and which was three and one-eighth inches in length, was lying loose in the laceration, while the fibula, which was also fractured, was bowed strongly outward, one fragment being thrust through the integument. Notwithstanding the fact that fully one-third of the tibia at its middle was removed, the boy made a good recovery, and the periosteum which was left developed new bone to such an extent that there was but one-half an inch shortening.⁴

Dr. W. P. Moon, of Philadelphia, reports the excision of eight and one-half inches of the tibia for necrosis, resulting from a gun-shot wound received at the battle of Petersburg.

¹ See "Biennial Retrospect of Medicine and Surgery," 1867, p. 259.

² *American Journal of Medical Sciences*, January, 1866, p. 279.

³ *Loc. cit.*, p. 264.

⁴ *New York Medical Journal*, vol. i., p. 84.

The periosteum was left, and new bone formed through the entire extent of the wound. The operation was performed October 24, 1864, and on May 10, 1865, he is reported as having recovered.

Dr. Moon removed five and one-half inches of the tibia from another case on November 7, 1865, under similar circumstances, with an equally successful result.

MEDICAL WORKS

PUBLISHED BY D. APPLETON & CO.

Anstie on Neuralgia. 1 vol., 12mo.	Cloth, \$2 50
Bartholow's Treatise on Therapeutics.	" 5 00
Barker on Puerperal Diseases. 1 vol.	" 5 00
Barker on Sea-Sickness. 1 vol., 16mo.	" 75
Barnes's Obstetric Operations. 1 vol., 8vo.	" 4 50
Bellevue and Charity Hospital Reports. 1 vol., 8vo.	" 4 00
Bennet's Winter and Spring on the Mediterranean. 1 vol., 12mo.	" 3 50
Bennet on the Treatment of Pulmonary Consumption. 1 vol., 8vo.	" 1 50
Billroth's General Surgical Pathology and Therapeutics. 1 vol., 8vo.	" 5 00
Buck's Contributions to Reparative Surgery. 1 vol., 8vo.	" 3 00
Bastian on the Common Forms of Paralysis from Brain Diseases.	" 1 75
Bulkley's (L. D.) Acne; its Pathology, etc.	(In press.)
Combe on the Management of Infancy. 1 vol., 12mo.	Cloth, 1 50
Carpenter's Mental Physiology.	" 3 00
Chauveau's Comparative Anatomy of the Domesticated Animals. Edited by George Fleming, F.R.G.S., M.A.I. 1 vol., 8vo, with 450 Illustrations.	" 6 00
Davis's (Henry G.) Conservative Surgery.	" 3 00
Dickson on Medicine in Relation to the Mind.	" 3 50
Elliot's Obstetric Clinic. 1 vol., 8vo.	" 4 50
Ecker's Convulsions of the Brain.	" 1 25
Flint's Physiology. 5 vols., 8vo.	Cloth, per vol., \$4 50; Sheep, 5 50
Flint's Text-Book of Human Physiology. 1 vol., 8vo.	Cloth, \$6 00;
Flint's Manual on Urine. 1 vol., 12mo.	Cloth, 1 00
Flint's Relations of Urea to Exercise. 1 vol., 8vo.	" 1 00
Frey's Histology and Histo-Chemistry of Man.	" 5 00
Hofmann's Manual of Medicinal Chemicals.	" 3 00
Holland's (Sir Henry) Recollections of Past Life. 1 vol., 12mo.	" 2 00
Howe on Emergencies. 1 vol., 8vo.	" 3 00
Howe on the Breath, and the Diseases which give it a Fetid Odor.	" 1 00
Huxley on the Anatomy of Vertebrated Animals. 1 vol.	" 2 50
Huxley and Youmans's Physiology and Hygiene. 1 vol., 12mo.	" 1 75
Hammond's Insanity in its Relations to Crime. 1 vol., 8vo.	" 1 00
Hammond's Diseases of the Nervous System. 1 vol., 8vo.	Cloth, \$6 00; Sheep, 7 00
Hammond's Clinical Lectures on Diseases of the Nervous System. 1 vol., 8vo.	" 3 50
Hamilton's (A. McL.) Electro-Therapeutics. 1 vol., 8vo.	Cloth, 2 00
Johnston's Chemistry of Common Life. 2 vols., 12mo.	" 3 00
Keyes's (E. L.) Tonic Treatment of Syphilis.	" 1 00
Lettermann's Recollections of the Army of the Potomac. 1 vol., 8vo.	" 1 00
Lewes's Physiology of Common Life. 2 vols., 12mo.	" 3 00
Markee on Diseases of the Bones. 1 vol., 8vo.	" 4 50
Maudsley on the Mind. 1 vol., 8vo.	" 3 50
Maudsley's Body and Mind. 1 vol., 12mo.	" 1 00
Maudsley on Responsibility in Mental Disease.	" 1 50
Meyer's Electricity. 1 vol., 8vo.	" 4 50
Niemeyer's Practical Medicine. 2 vols., 8vo.	Cloth, \$9 00; Sheep, 11 00
Neffel on Galvano-Therapeutics. 1 vol., 12mo.	Cloth, 1 50
Nightingale's Notes on Nursing. 1 vol., 12mo.	" 75
Neumann on Skin Diseases. 1 vol., 8vo.	" 4 00
New York Medical Journal.	\$4 00 per annum. Specimen copies, 35
Paget's Clinical Lectures and Essays. 1 vol., 8vo.	Cloth, 5 00
Peaslee on Ovarian Tumors. 1 vol., 8vo.	" 5 00
Pereira's Materia Medica and Therapeutics. 1 vol., 8vo.	Cloth, \$7 00; Sheep, 8 00
Richardson's Diseases of Modern Life. 1 vol., 12mo.	Cloth, 2 00
Sayre's Club-Foot. 1 vol., 12mo.	" 1 00
Sayre's Orthopedic Surgery. With the Operations incident to Deformities. With numerous Illustrations.	Cloth, \$5 00; Sheep, 6 00
Schroeder on Obstetrics. 1 vol., 8vo.	Cloth, 3 50
Steiner's Compendium of Children's Diseases.	" 3 50
Stroud's Physical Cause of the Death of Christ. 1 vol., 12mo.	" 2 00
Swett on Diseases of the Chest. 1 vol., 8vo.	" 3 50
Simpson's (Sir Jas. Y.) Complete Works. Vol. I. Obstetrics and Gynecology. 8vo. Vol. II. Anesthesia, Hospitalism, etc. 8vo. Vol. III. The Diseases of Women.	Per vol., Cloth, \$3 00; Sheep, 4 00
Tilt's Uterine Therapeutics. 1 vol., 8vo.	Cloth, 3 50
Van Buren on Diseases of the Rectum. 1 vol., 12mo.	" 1 50
Van Buren & Keyes's Genito-Urinary Diseases, with Syphilis. Cloth, \$5; Sheep,	6 00
Vogel's Diseases of Children. 1 vol., 8vo.	Cloth, \$4 50;
Wells on Diseases of the Ovaries. 1 vol., 8vo.	Cloth, 5 00
Wagner's Chemical Technology. 1 vol., 8vo.	" 5 00
Walton's Mineral Springs of the United States and Canada. With Analyses and Notes on the Prominent Spas of Europe.	" 2 00

. Any of these works will be mailed, post-free, to any part of the United States, on receipt of the price.

A large and carefully-selected stock of Medical Works, American and Foreign, constantly on hand. Descriptive Catalogue forwarded on application.

Physicians desiring to have their names inserted in our Medical Directory of the United States and Canada, will please send them in full, with addresses. No charge.

D. APPLETON & CO., Publishers, 549 & 551 Broadway, New York.

APPLETONS' AMERICAN CYCLOPÆDIA.

NEW REVISED EDITION.

Entirely rewritten by the ablest writers on every subject. Printed from new type, and illustrated with Several Thousand Engravings and Maps.

The work originally published under the title of THE NEW AMERICAN CYCLOPÆDIA was completed in 1863, since which time the wide circulation which it has attained in all parts of the United States, and the signal developments which have taken place in every branch of science, literature, and art, have induced the editors and publishers to submit it to an exact and thorough revision, and to issue a new edition entitled THE AMERICAN CYCLOPÆDIA.

Within the last ten years the progress of discovery in every department of knowledge has made a new work of reference an imperative want.

The movement of political affairs has kept pace with the discoveries of science, and their fruitful application to the industrial and useful arts and the convenience and refinement of social life. Great wars and consequent revolutions have occurred, involving national changes of peculiar moment. The civil war of our own country, which was at its height when the last volume of the old work appeared, has happily been ended, and a new course of commercial and industrial activity has been commenced.

Large accessions to our geographical knowledge have been made by the indefatigable explorers of Africa.

The great political revolutions of the last decade, with the natural result of the lapse of time, have brought into public view a multitude of new men, whose names are in every one's mouth, and of whose lives every one is curious to know the particulars. Great battles have been fought, and important sieges maintained, of which the details are as yet preserved only in the newspapers, or in the transient publications of the day, but which ought now to take their place in permanent and authentic history.

In preparing the present edition for the press, it has accordingly been the aim of the editors to bring down the information to the latest possible dates, and to furnish an accurate account of the most recent discoveries in science, of every fresh production in literature, and the newest inventions in the practical arts, as well as to give a succinct and original record of the progress of political and historical events.

The work has been begun after long and careful preliminary labor, and with the most ample resources for carrying it on to a successful termination.

None of the original stereotype plates have been used, but every page has been printed on new type, forming in fact a new Cyclopædia, with the same plan and compass as its predecessor, but with a far greater pecuniary expenditure, and with such improvements in its composition as have been suggested by longer experience and enlarged knowledge.

The illustrations, which are introduced for the first time in the present edition, have been added not for the sake of pictorial effect, but to give greater lucidity and force to the explanations in the text. They embrace all branches of science and of natural history, and depict the most famous and remarkable features of scenery, architecture, and art, as well as the various processes of mechanics and manufactures. Although intended for instruction rather than embellishment, no pains have been spared to insure their artistic excellence; the cost of their execution is enormous, and it is believed that they will find a welcome reception as an admirable feature of the Cyclopædia, and worthy of its high character.

This work is sold to subscribers only, payable on delivery of each volume. It is now completed in sixteen large octavo volumes, each containing over 800 pages, fully illustrated with several thousand Wood Engravings, and with numerous colored Lithographic Maps.

PRICE AND STYLE OF BINDING.

<i>In extra cloth, per vol.</i> \$5.00	<i>In half russias, extra gilt, per vol.*</i> . . . \$8.00
<i>In library leather, per vol.</i> 6.00	<i>In full morocco antique, gilt edges, per vol.</i> . . 10.00
<i>In half turkey morocco, per vol.</i> 7.00	<i>In full russias, per vol.</i> 10.00

* * Specimen pages of the AMERICAN CYCLOPÆDIA, showing type, illustrations, etc., will be sent gratis, on application.

D. APPLETON & CO., PUBLISHERS,

549 & 551 Broadway, New York.